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Amendments to the Claims

This listing of claims will replace all prior versions and listings of the claims in the application:

1. (Presently Amended) A fluorescence detection system for detecting predetermined materials in a sample fluid, comprising:

A. a photonic band gap structure characterized by a photonic band gap, and including an internal surface that defines a core region; wherein said internal surface of said photonic band gap structure is coated with a film formed of a plurality of conjugated polymer molecules, said core region being adapted to receive a sample fluid therein;

B. an optical source for generating excitation light characterized by a wavelength outside said photonic band gap ~~end~~ and directed to said core region; wherein said predetermined material is capable of interacting with at least one of said plurality of molecules whereby upon such interaction and in response to said excitation light, said at least one of said conjugated polymer molecules generates a fluorescent signal; and

C. an optical detector for detecting said fluorescence signal; wherein said photonic band gap structure is adapted to guide said fluorescence signal through said core region and onto said detector for detection by said detector.

2. (Presently Amended) A fluorescence detection system according to claim 1, wherein said at ~~least one of said biological matter~~ predetermined material interacts with said at least one of said conjugated polymer molecules through a binding event.

3. (Canceled)

4. (Canceled)

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5. (Canceled)

6. (Presently amended) A fluorescence detection system according to claim 1, wherein said fluorescence signal comprises fluorescence emissions from a plurality of said conjugated polymer molecules.

7. (Previously presented) A fluorescence detection system according to claim 1, wherein the collection efficiency of said fluorescence detection system is about 25%.

8. (Previously presented) A fluorescence detection system according to claim 1, wherein the signal-to-noise ratio for said fluorescence detection system is about 30.

9. (Previously presented) A fluorescence detection system according to claim 1, wherein said optical source is a laser.

10. (Previously presented) A fluorescence detection system according to claim 1, wherein said predetermined material is selected from the group consisting of bacteria, antibodies, cells, and proteins.

11. (Previously presented) A fluorescence detection system according to claim 1, wherein said optical detector is a photomultiplier.

12. (Previously presented) A fluorescence detection system according to claim 1, wherein a volume of said fluid is less than about one microliter.

13. (Previously presented) A fluorescence detection system according to claim 1, wherein a

diameter of said core region is about 14.5 microns.

14. (Previously presented) A fluorescence detection system according to claim 1, wherein said predetermined material may comprise at least one of a biological microorganism and/or a chemical.

15. (Previously presented) A fluorescence detection system according to claim 14, wherein said chemical is TNT.

16. (Previously presented) A fluorescence detection system according to claim 1, wherein said sample fluid comprises a liquid.

17. (Previously presented) A fluorescence detection system according to claim 1, wherein said sample fluid comprises a gas.

18. (Previously presented) A fluorescence detection system according to claim 1, wherein said wavelength of said fluorescent light is from about 400 nm to about 700 nm.

19. (Previously presented) A fluorescence detection system according to claim 1, wherein said photonic band gap structure is selected from the group consisting of a photonic band gap fiber and a photonic band gap crystal.

20. (Previously presented) A fluorescence detection system according to claim 1, wherein said photonic band gap structure is configured so that said core region is adapted to be filled with said fluid via a capillary action.

21. (Currently amended) A detector array for fluorescence detection of predetermined materials in a sample fluid, said detector array comprising:

A. an array of photonic band gap fibers each of said photon band gap fibers being characterized by a photonic band gap, and each photonic band gap fiber including an internal surface that defines a hollow core region; wherein each internal surface of each photonic band gap fiber is coated with a film formed of a plurality of conjugated polymer molecules, and wherein said core regions are adapted to receive a sample fluid; and

B. an optical source for generating excitation light characterized by a wavelength outside said photonic band gap, and directed to said core regions; wherein said predetermined material is capable of binding with at least one of said plurality of conjugated polymer molecules and upon such binding of one of said plurality of conjugated polymer molecules, said one conjugated polymer molecule is responsive to said excitation light so as to generate a fluorescence signal characterized by a wavelength within said photonic band gap; and

C. a detector for detecting said fluorescence signal; wherein each photonic band gap fiber is adapted to guide said fluorescence signal through said core region and onto said detector for detection by said detector.

22. (Canceled)

23. (Canceled)

24. (Presently amended) A detector array according to claim ~~23~~ 21 wherein said core regions of said fibers extend along substantially parallel axes and wherein said detector id disposed along said axes.

25. (Previously presented) A detector array according to claim 24 wherein said optical source directs said excitation light to said core regions at least in part transverse to said axes.

26. (Previously presented) A fluorescence detection system according to claim 1 wherein said photonic band gap structure is tubular along an axis wherein said core region extends along said axis, and wherein said optical detector is disposed along said axis.

27. (Previously presented) A fluorescence detection system according to claim 26 wherein said optical source directs said excitation light to said core region at least in part transverse to said axis.